100 Mile House Forest District

Inventory Plan

MINISTRY OF FORESTS
RESOURCES INVENTORY BRANCH
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1. INTRODUCTION

1.1 Background

The Provincial Vegetation Resources Inventory (VRI) is an improved vegetation (forest) inventory process or toolbox for assessing the quantity and quality of British Columbia's timber and other vegetation resources. It addresses the concerns expressed by the Forest Resources Commission in its 1991 report, *The Future of our Forests*. These concerns included:

- lack of statements of precision of the inventory;
- inadequate information on non-timber vegetation resources;
- lack of reliable estimates of growth rates and stand specific volumes; and
- narrow focus on commercial timber volume and the timber harvesting landbase.

The VRI can be implemented at a number of levels depending on the business needs. It can be deployed over the entire province (one or more Forest District at a time), measuring all the timber and non-timber resources. The VRI can also be deployed over a Management Unit (TFL or TSA) or a small watershed within a District, measuring selected resources in specific portions of the landbase.

The Provincial Inventory consists of a system of protocols, models and databases that can be managed through a dispersed computing environment. The Provincial Inventory process can be used to meet today's needs for timber supply, long term planning, silviculture planning, defining sustainability, public information and credibility. The Provincial Inventory can also provide data for computer modeling and decision support systems to support a baseline biodiversity assessment and for research.

The Vegetation Resources Inventory is designed to determine:

- the amount of vegetation cover in the province;
- the location of vegetation resources in the province; and
- the changes in the amount and location of vegetation resource over time.

The principles guiding the implementation of the inventory are:

- to integrate provincial inventory activities (e.g. Management Inventories, Provincial Inventory, National Forest Inventory and Monitoring);
- to implement inventory projects to satisfy business requirements as defined in the inventory plans; and
- to maximize the usefulness of sample plots and minimize overall costs by implementing a cascading plot approach that ensures that information collection meets the VRI standards while meeting multiple goals.

Management Inventories include inventories conducted in Implementation Units[1], to fulfill specific forest management or business needs. Sampling error and sampling intensity are controlled for specific vegetation attributes (e.g., timber volume) to achieve specific inventory objectives. There are several types of Implementation Units in the province: Timber Supply Areas (TSAs), Tree Farm Licenses (TFLs), and other lands (parks, private lands, and other public lands). Within (or across) these Implementation Units there may be Management Inventories addressing specific issues such as Problem Forest Types, or other strata in a TSA (or groups of TSAs).

Management Inventories are typically timber emphasis inventories. Besides providing detailed polygon information for day-to-day forest management, they can also be used to increase precision of the Provincial inventory. The TFL holders or the MoF Regions/Districts are responsible for the planning and implementation of these inventories. However, the Ministry of Forests Resources Inventory Branch requires the TFL holders or Districts to prepare an inventory business plan, which includes a sampling plan, for its approval. An inventory business plan defines the inventory needs, the information needed to meet the needs, and the methods for collecting the information. This business plan then drives the inventory project plans.

1.2 Objectives

This is a plan for implementing the Provincial Vegetation Resources Inventory and Management Inventory activities in the 100 Mile House Forest District in the Cariboo Forest Region. This plan was developed through consultation with various stakeholders on May 13, 1997 in the Forest District's, including the Ministry of Forests, Branch, Region and District staff, the Ministry of Environment, Lands and Parks Cariboo Region, CLMA, Weldwood of Canada Ltd., Lignum Ltd., Ainsworth, Inland Timber Management Ltd., DWB Forestry and Montane Forest Consultants Ltd.. Management issues identified in the recent Timber Supply Review in the TSA were also reviewed.

The purpose of the Inventory Plan is to:

1. define the Management Inventory objectives;
2. define the Provincial Inventory strategy for 100 Mile House Forest District;
3. identify the inventory activities required to satisfy the objectives for both inventories; and
4. outline the implementation steps.

This plan is based on the consultant report, *100 Mile House Forest District Vegetation Resources Inventory Ground Sampling Plan, Revised Final Report*, prepared by J.S. Thrower & Associates. The report was prepared following the procedures outlined in the Ministry of Forests, Resources Inventory Branch procedures *Vegetation Resources*

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[1] Implementation Units are a specified area of land such as a TSA, TFL, Innovative Forest Practices Agreement area, etc. For any Implementation Unit, there can be none to several Management Unit inventories based on stakeholder business needs.

Inventory: Preparing a sampling plan for ground sampling (March 1997). The report has been reviewed by stakeholders in the District and is attached to this Inventory Plan (see Appendix A).

This Inventory Plan identifies stakeholder requirements at a given point in time. As such, it is anticipated that there will be changes to this plan. Any changes including plans that are more detailed and roles and responsibilities will be added to this plan as an addendum.

2. BUSINESS CONSIDERATIONS

2.1 Forest Management Issues

Forest management issues were identified during the recent timber supply review (Table 1). An assessment of potential impacts of the VRI ground sampling on these management issues is also shown in these tables.

Table 1. Forest management issues for the 100 Mile House Forest District and the potential impact on the Provincial Inventory.

	Issue[2]	Remarks
1.	Clarify the amount of area permitted to be below green-up across the TSA.	Phase II will provide overall District proportion of regenerated areas that are below a specified green-up height threshold. However, VRI estimates may be more variable than needed for management decisions.
2.	Clarify the amount of environmentally sensitive areas (ESAs).	Phase II will provide overall District proportion of ESAs. However, this issue will probably require better Phase I estimates to be satisfactorily addressed. In any case, the MOF is moving away from classifying areas as ESAs in favor of describing the physical attributes of these areas.
3.	Clarify & refine deduction factors required for roads, trails, and landings.	Application of the Inventory.
4.	Operability on steep slopes: harvest potential and mapping required.	The operability mapping is complete. Phase II adjustment data will help provide more accurate timber volume estimates for polygons on steep slopes.
5.	Account for differences in the management strategies of CCLUP and those modelled in the BCFS analysis.	Phase II plant lists, forage production, and shrub transects provide District totals and averages, which could be used to confirm assumptions made in the CCLUP and BCFS analyses.
6.	Clarify cutblock adjacency requirements.	Application of the Inventory.

[2] Forest Management Issues Identified Through the AAC Determination Process. TSA/TFL Timber Supply Reviews: 1992-1996. 31 December 1996. Timber Supply Branch. MOF. Victoria. BC. Pages 28-30.

7.	Site productivity.	Site index measurements from Phase II plots can be used to help check the site index estimates in the current inventory database, and to develop correlations with other attributes. However, these data will not address the issue of potential site index and productivity that is applicable for managed stands.
8.	Site index on wildlife habitat areas: assess increased harvest potential.	Plant lists, forage production, and shrub transects from Phase II plots provide District totals, which could be used to confirm base interpretations for wildlife and for biodiversity. Improved Phase I estimates will provide additional information on delineating wildlife habitat and protected areas.
9.	Inventory audit, when completed, should provide information for assessing the accuracy of volume & age estimates for existing stands.	The inventory audit showed that volume was over-stated in the operable landbase. Phase II will lead to improved District net volumes by removing this overall bias through statistical adjustment. Statistical statements of accuracy for the overall inventory will be provided.
10.	Twenty-year timber availability study results to assess information for future AAC analyses.	The new inventory will provide improved District net volumes, which could be used to check volume assumptions made in the 1995 study.
11.	Uneven-aged management.	Phase II data can be used to help check the volumes assigned to the dry-belt fir stands. However, the VRI will not address many growth and yield issues in these stands.
12.	Archaeological/traditional use.	Plant lists from Phase II will provide incidence data for medicinal plants and other botanical products, as a basis for additional sampling.
13.	Assess implications of alternative harvesting systems.	Phase II adjustment data will help provide more accurate estimates for polygons on steep slopes (see Issue 4).

2.2 Inventory Issues

The most recent Timber Supply Review[3] and the Inventory Audit[4] identified specific issues and information needed to improve the timber inventory. These are related to management issues (Table 4), and include:

- Accuracy of the mature timber volumes in the operable land base.
- Green-up age estimation.
- Identification of problem forest types (PFTs).

[3] Forest Management Issues Identified Through the AAC Determination Process. TSA/TFL Timber Supply Reviews: 1992-1996. 31 December 1996. Timber Supply Branch, MOF, Victoria, BC. Pages 28-30.

[4] Ministry of Forests. 1994. 100 Mile House Inventory Audit. Resources Inventory Branch, Victoria, BC. 4pp.

- Range maintenance (encroachment of pine).
- Dry-belt fir issues: potentially incorrect volumes; difficulty identifying dry-belt fir stands; and inaccurate estimates of wildlife-related attributes (e.g., crown closure and aspect).
- Wildlife habitat area delineation.
- Old-growth forest cover biodiversity requirement: age class 8 and 9 designations are too broad for biodiversity planning.
- Uncertainty in regenerated stand volumes.
- Under-estimation of non-recoverable losses due to disease, insects, and fire.
- Riparian habitat areas.
- Wetland complexes.
- Provincial and district monitoring of the indicators of sustainable forest management, as defined by the Canadian Council of Forest Ministers (CCFM).[5] Monitoring would involve measuring changes and trends in some of these indicators, which include percent and extent of area by forest type and age class, and mean annual increment by forest type and age class.
- Issues raised by the Forest Resources Commission's 1991 report, *The Future of Our Forests*, regarding the inadequacy of forest inventories in the province. These concerns included lack of statements of precision on the inventory, inadequate information on non-timber vegetation, and the narrow focus on commercial timber volume and the operable landbase.

3. INVENTORY PLAN

3.1 Provincial Inventory

3.1.1 Provincial Inventory Landbase

The inventory unit for the 100 Mile House VRI is the entire Forest District, which coincides with the 100 Mile House Timber Supply Area (TSA). The District is located between the Fraser River and the Quesnel Highlands in the Cariboo Forest Region. The Forest District covers 1,365,422 ha, and approximately 60% is considered available for timber harvesting.

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[5] Canadian Council of Forest Ministers. 1995. Defining sustainable forest management. A Canadian approach to criteria and indicators. Natural Resources Canada, Canadian Forest Service, Ottawa, Ontario. 22 pages.

3.1.2 Objectives

3.1.2.1 Photo Interpretation

Photo interpretation work has been considered but is not recommended for the 100 Mile House Provincial Inventory.

3.1.2.2 Ground Sampling

The objective of the Provincial Inventory Phase II ground sampling in the 100 Mile House Forest District is to estimate overall vegetation totals and averages, provide a framework for sub-sampling, and check range classification and the correlations between range and tree attributes. The number of ground samples should aim to achieve a sampling error of ± 10% (95% probability) for timber volume in the TSA, and allow for calculation of sampling errors for other VRI attributes. The key attribute of interest is timber volume. The VRI will cover the entire TSA including the timber harvesting landbase, inoperable landbase, parks, and private lands.

3.1.3 Sampling Plan

3.1.3.1 Sample Size

To achieve the inventory objectives as identified above, the sample sizes required to implement the Provincial Inventory are summarized in Table 2. In inventory, a sampling error standard is necessary to provide a basis for determining sample size. In the VRI, the allowable sampling error standard is set at ±10% for volume estimation at the Unit/TSA level. This standard does not apply to the other attributes in the inventory.

The number of samples required to achieve the standard is a function of the variation within the inventory unit, estimated by the coefficient of variation (CV%). The estimated CV in the 100 Mile House Forest District used to estimate the total number of plots to achieve a sampling error of ±10% for net volume is 46%[6]. To achieve the Provincial Inventory standard at a reasonable cost, two types of VRI plots will be used:

- full VRI samples, where the full suite of information (timber, coarse woody debris, range and ecology) is collected; and
- tree emphasis samples, where only tree information is collected.

The total number of full VRI samples (40) will be adequate to achieve a sampling error of ±15% in the treed landbase. Tree emphasis samples (TEP) (50) will then be used to reduce the sampling error in the treed landbase to ±10% to achieve the standard.

In the remaining non treed area of the unit, the number of full VRI samples established (15) will be the ratio of the treed to remaining landbase, multiplied by the number of treed VRI samples required to achieve a sampling error of ±15%.

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[6] The inventory audit CV was inflated by 25% to account for the possible differences between the CV estimates based on the VRI design (a tight 5-plot cluster) and based on the inventory audit (a well-distributed 9-plot cluster).

Implementing the two types of samples will ensure a minimum number of full VRI plots are established across the landscape to collect the full suite of VRI information. Establishing TEPs to boost the number of plots required to achieve the VRI standard will result in saved time and money.

To complete the Provincial Inventory, NVAF (net volume adjustment factor) and WPV (within polygon variation) sampling is required. The numbers of these types of samples are contained in Table 2.

Table 2. The estimated sample size required to implement the Provincial Inventory.

Ground Sampling Activity	Sampling Unit	VRI Samples	Tree Emphasis Samples	Sample Size
Provincial Inventory				
Vegetated Treed	Cluster	40	50	90
Other	Cluster	15	-	15
Net Volume Adjustment Factor	Trees	75		75
Within Polygon Variation	Polygon	30		30

3.1.3.2 Provincial Inventory Sampling

To achieve the Provincial Inventory objective, the sampling should be implemented in a two-step process. Step 1 is to install approximately 53 sample clusters in the first field season over the entire TSA. Step 2 is to install the remaining sample clusters in the second field season. The sampling locations will be selected systematically from the sorted list of potential sampling points. This list will include all polygons in the TSA and will be sorted by non-vegetated/vegetated and then land type, leading tree species, age, and site index. Sampling in the first year will provide experience to refine the process for the second field season, and information to calculate precisely the remaining number of samples required to meet the precision target of ±10% for total net volume in the treed portion of the District. An estimated total of 105 sample clusters will be assumed for planning, training, and other logistic considerations. Matching unavailable sampling sites with sub-sampling of sample clusters with difficult access will be anticipated and planned for, as these activities will increase inventory costs.

A two-step approach should also be used for implementing the other ground sampling activities that support the Provincial Inventory process: NVAF sampling and WPV sampling. NVAF provides a factor to adjust the net volume from the ground sampling (derived from the net factoring process and taper equations) to account for hidden decay and possible bias in taper equations. WPV information is used to express the total error of the inventory and to indicate accuracy of individual polygon estimates. A total of 75 sample trees for NVAF sampling (selected from 15 treed and 1 non-treed polygons) and 30 sample polygons for WPV sampling are required.

3.2 Management Inventory

3.2.1 Management Unit Landbase

For the 100 Mile House Forest District, five Management Units were created to address the inventory issues raised by the stakeholders. These sub-units correspond to specific vegetation types (the interior Douglas-fir stands (IDF); Problem Forest Types; Range Unit; and immature stands) and Lignum's Innovative Forest Practices Agreement Area. Table 3 outlines the area by inventory unit within the 100 Mile House Forest District.

Table 3. Area by Inventory Unit within the 100 Mile House Forest District.

Inventory Type	Inventory Unit	Area (ha)
Provincial	100 Mile House Forest District	1,365,422
Management	Interior Douglas-fir	Not Available
	Problem Forest Types	Not Available
	Range Units	Not Available
	Immature Stands	Not Available
	Lignum Area (100 Mile House TSA)	177,717 ha

3.2.2 Objectives

3.2.2.1 Photo Interpretation

The Lignum Management Inventory is undertaking new photo interpretation to improve the photo estimates. Photo interpretation in other Management Inventories was considered but is not being undertaken at this time.

3.2.2.2 Ground Sampling

The ground sampling objectives for the Management Inventories are to:

- The objective of this sub-unit inventory is to improve the inventory information about the interior Douglas-fir (Fdi) forest types. The characteristics identified as being important to improve the information about these forest types is vertical structure and diameter distributions of stems and volumes for individual polygons;
- The objective of the PFT sub-unit inventory is to confirm the presence, location, and volume of PFTs in the District;
- The objective of this sub-unit inventory is to classify and sample range production and species in two Range Units (Upper Loon and Canoe Creek) selected by the District;

- provide additional information to adjust inventory attributes for most Age Class 1 and 2 stands in the TSA[7]; and
- meet Lignum's Innovative Forest Practices Agreement objectives on the company's traditional operating area in Williams Lake and 100 Mile House TSAs[8].

3.2.3 Sampling Plan

To achieve the objectives of the Management Inventories, Timber Emphasis Sampling will be required. The Timber Emphasis Sampling must meet the minimum sampling requirements as specified in *Implementation Strategy to Integrate Management, Provincial and National Inventories* (MoF, Resources Inventory Branch) The supplemental sampling will involve the installation of approximately:

- 350 sample clusters in the Interior Douglas-fir stands;
- 150 sample clusters in problem forest types;
- Range Unit sampling numbers currently not available;
- Immature Stand project currently underway; and
- 350[9] sample clusters distributed over Lignum's landbase.

The implementation should proceed in a manner similar to the Provincial Inventory ground sampling. The sampling will be spread over a period of 2 years, with unbiased interim results expected after the first season. Sampling in the first year will provide experience to refine the process for the second field season and information to calculate precisely the remaining number of samples required to meet the precision target of ±10%.

NVAF sampling is not required for Management Inventories however it is strongly encouraged. Stakeholders should identify within their more detailed *Inventory Plans*[10] if NVAF sampling is to be conducted.

4. IMPLEMENTATION STRATEGY

The ground samples that are established to meet the Management Inventory objectives are compatible with the Provincial Inventory objectives providing that these dual-purpose

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[7] This project is currently underway. The results of this project may satisfy most needs for updated inventory information for immature stands in the TSA. However, the results should be reviewed with stakeholders to determine if other information is needed after the project is complete.

[8] Lignum's area includes about 11% and 12% of the Williams Lake and 100 Mile House TSAs, respectively. Several activities (e.g., growth and yield, and inventory) have been identified as part of this initiative. Implementation of the VRI ground sampling and the tree emphasis inventory is part of the inventory component of these activities.

[9] Total for the Lignum area includes Williams Lake TSA.

[10] Inventory Plans are required by stakeholders in order to proceed with their Management Inventories.

plots are identified prior to establishment. Therefore, Provincial Inventory plots will be identified prior to identifying the Management Inventory ground sampling plots. These coincident plots will be used for both the Provincial Inventory and the Management Inventory. Additional Management Inventory samples will be established to meet Management Inventory objectives. This integrated approach, that uses one set of samples to address multiple inventory needs, will result in minimum implementation costs.

There may be a need to enhance the coincident plots for non-timber attributes within the Management Inventories depending on the implementation strategy chosen. Additional Provincial Inventory ground samples will need to be established in the non-Management Inventory area in order to complete the Provincial Inventory for the Kamloops and Clearwater Forest Districts.

The inventory outlined above will be to the Ministry of Forests minimum standards as outlined in *Implementation Strategy to Integrate Management, Provincial and National Inventories*.

4.1 Steps

There are several ways to complete the ground sampling in the two-step process stated above. It is hoped that stakeholders will complete all the required ground sampling in a timely manner. One possible scenario is as follows:

1. Install a large number of each Management Inventory sample clusters (e.g., 100) over the entire landbase measuring *only those* tree attributes related to timber volume and site index. Install the Provincial Inventory samples for plots that are designated "multi-purpose" and install tree emphasis plots for the others. This will provide the experience to refine the process for the second field season and will provide information to calculate the required number of remaining sample clusters.
2. Install the remaining Management Inventory sample clusters in the second field season. (Note: the stakeholder may choose to install all ground samples in one field season).

4.1.2 Implementation Process

The implementation process will proceed based on available funding and can be implemented based on a number of scenarios. All implementation scenarios will a common process. One possible implementation process could proceed as follows:

1. Assemble all polygons within the District into one list; check to ensure no areas are missing or double counted.
2. Sort the polygon list according to the criteria: BC Land Cover Classification code, estimated leading tree species, age, and site index.
3. Select potential sampling points from the sorted list, as described in the Ministry of Forests, Resources Inventory Branch document *Vegetation Resources Inventory: Preparing a sampling plan for ground sampling*.

4. Stratify list to *vegetated treed* and *remaining area* (non-vegetated, vegetated non-treed).
5. Systematically select the Provincial Inventory samples by stratum.
6. Systematically select the polygons for the WPV sampling from the list of Provincial Inventory samples.
7. Systematically select the 16 NVAF sample points (15 treed and 1 non-treed whether or not volume is indicated) from the Provincial Inventory ground samples.
8. Stratify the District to determine the Provincial Inventory samples that meet Management Inventory objectives. Subtract this number of samples from the total required for each Management Inventory. Select the remaining number of Management Inventory samples.
9. For the Management Inventory, systematically select a batch of sampling points from the list of operable sampling points (80% of the sample size) and from the list of inoperable sampling points (20%).
10. Begin planning for field sampling.
11. Prepare a field sampling plan that includes sample cluster batches to ensure an unbiased sample is attained at the end of the first field season. Identify NVAF sample points and ensure they are field sampled early in the field season.
12. Locate and measure ground sample clusters.
13. Monitor quality assurance of field data and procedures during field sampling. Arrange for 'audit quality cruisers' to sample auxiliary plots of NVAF samples.
14. Compile the data in the fall and winter of the first year. This will include computing averages of timber volume, basal area, and regression of photo estimated volume to ground sample volume and the associated standard error of the regression.
15. Prepare NVAF tree sampling matrix. Begin NVAF destructive sampling.
16. Prepare for the second step during the winter. This will include calculation of the CV based on the standard error of the regression. The remaining number of samples required to achieve the stated desired precision can then be accurately determined using standard procedures (see Appendix B).
17. Prepare the remaining samples.
18. Locate and measure remaining ground sample clusters in the second field season. Complete stem analysis of the NVAF sample trees. Complete the within polygon variation sampling.
19. Compile all data, do the statistical adjustments and load final inventory results into the provincial database.

4.2 Cost

4.2.1 Provincial Inventory

The Provincial Inventory costs, for planning purposes, are summarized in Table 4.

A CV of 46 % and the objective precision level of ±10% sampling error (at the 95% probability level) were used to estimate the required number of Provincial Inventory samples.

Sampling efficiency and cost effectiveness will be achieved by implementing the Management Inventory sampling in combination with Provincial Inventory ground sampling. Results of the VRI ground sampling can be evaluated to determine the additional sampling required for meeting the specific objectives.

Table 4. The estimated costs required to complete the Provincial Inventory sample plan.

Ground Sampling Unit	Sample size	Unit Cost* ($)	Total Cost ($)
Provincial Inventory			
Sample Cluster (VRI)	55	2,500	137,500
Sample Cluster (tree only)	50	1,500	75,000
Net Volume Adjustment Factor – Tree	75	500	37,500
Within Polygon Variation	30	1,500	45,000
Total			295,000

* The unit costs are based on experience gained from the Boston Bar Operational Trial.

4.2.2 Management Inventory

The costs for completing the Management Inventory plan are identified in Table 5.

Table 5. The estimated costs required to complete the Management Inventory sample plan.

Ground Sampling Unit	Sample size	Unit Cost ($)	Total Cost ($)
Management Inventory Sampling			
Interior Douglas-fir	350	1,500	525,000
Problem Forest Types	150	1,500	225,000
Range Units	N/A	1,500	N/A
Immature Stands	N/A	1,500	N/A
Lignum Area	350	1,500	525,000
Total	850		1,275,000

The sample size determination for the Management Inventory sampling can be found in the consultant report, *100 Mile House Forest District Vegetation Resources Inventory*

Ground Sampling Plan, Revised Final Report (Appendix A). The required number of Management Inventory samples is based on the appropriate CV (estimated) and the objective precision level of ±10% sampling error (at the 95% probability level).

4.2.3 Combined Management Inventory and Provincial Inventory

Implemented separately, the total cost of the Provincial Inventory and the Management Inventories would be approximately $1,570,000. Combining the inventory objectives through a common implementation strategy will realize savings. Given the multiple Management Inventories within the 100 Mile House Forest District and their overlapping areas, it is difficult to estimate the magnitude of these savings. However, the savings on the Provincial Inventory samples would be approximately $135,000 based on implementing all of the vegetated treed VRI and tree emphasis samples in combination with the Management Inventory plots.

Table 6 illustrates the cost for one possible implementation scenario where overlap occurs between one of the Management and the Provincial Inventory. The total cost could be higher or lower if the assumptions stated above are not valid. For example, an increase in the CV or a reduction in the desired precision level will result in an increase in the number of samples required to achieve the objectives. The relationship between the sampling error and sample size is illustrated in the contractor report (Appendix A).

Table 6. Combined costs to complete the Management and Provincial Inventory sample plans.

Ground Sampling Unit	Sample size	Unit Cost ($)	Total Cost ($)
Management Inventory Sampling			
Interior Douglas-fir	350	1,500	525,000
Problem Forest Types	150	1,500	225,000
Range Units	N/A	1,500	N/A
Immature Stands	N/A	1,500	N/A
Lignum Area	350	1,500	525,000
Incremental Provincial Inventory Ground Samples			
Sample Cluster (upgrade to full VRI)	40*	1,000	40,000
Sample Cluster (tree only)	50*	0	0
Provincial Inventory (Remaining)			
Sample Cluster (VRI)	15	2,500	37,500
Sample Cluster (tree only)	0	1,500	0
Net Volume Adjustment Factor - Tree	75	500	37,500
Within Polygon Variation	30	1,500	45,000
Total			1,435,000

*Tree information component to be captured as part of the Management Inventory sample

The total cost could be higher or lower if the assumptions stated above are not valid. For example, an increase in the CV or a reduction in the desired precision level will result in an increase in the number of samples required to achieve the objectives. The relationship between the sampling error and sample size is illustrated in the contractor report (Appendix A).

Depending on the implementation strategy, the savings will vary. The savings realized reflect the comparative overlaps of the Management Inventories. The numbers in Table 6 reflect one possible implementation scenario. Costs will change depending on the actual implementation scenario chosen.

4.3 Monitoring

The Ministry of Forests, Resources Inventory Branch is responsible for monitoring this Inventory Plan.

5. APPROVAL/SIGNING

I have read and concur with the 100 Mile House Forest District Inventory Plan, June 1, 1998. It is understood that this is an agreement-in-principle and does not commit the signatories to completing the inventory activities outlined within the plan. Modifications to this plan or more detailed plans need to be reviewed and approved by the signatories and then appended to this plan.

District Manager
100 Mile House Forest District

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Appendix A

100 Mile House Forest District
Vegetation Resources Inventory
Ground Sampling Plan

Appendix B

Polygon Selection